

A method detects binding of molecules, advantageously without tagging molecules in the sample. A sensor is used in which is included a single stranded nucleic acid sequence and a photoluminescent material in respective layers. After the sensor is exposed to a biological sample for sufficient time for its single stranded nucleic acid sequence to bind to a material of interest, photoluminescence from the sensor can be measured. An apparatus for tagging-free detection of binding of molecules also is provided. Methods of making tagging-free sensors are provided. Also, tagging-free methods to detect binding of antigens and related devices are disclosed.